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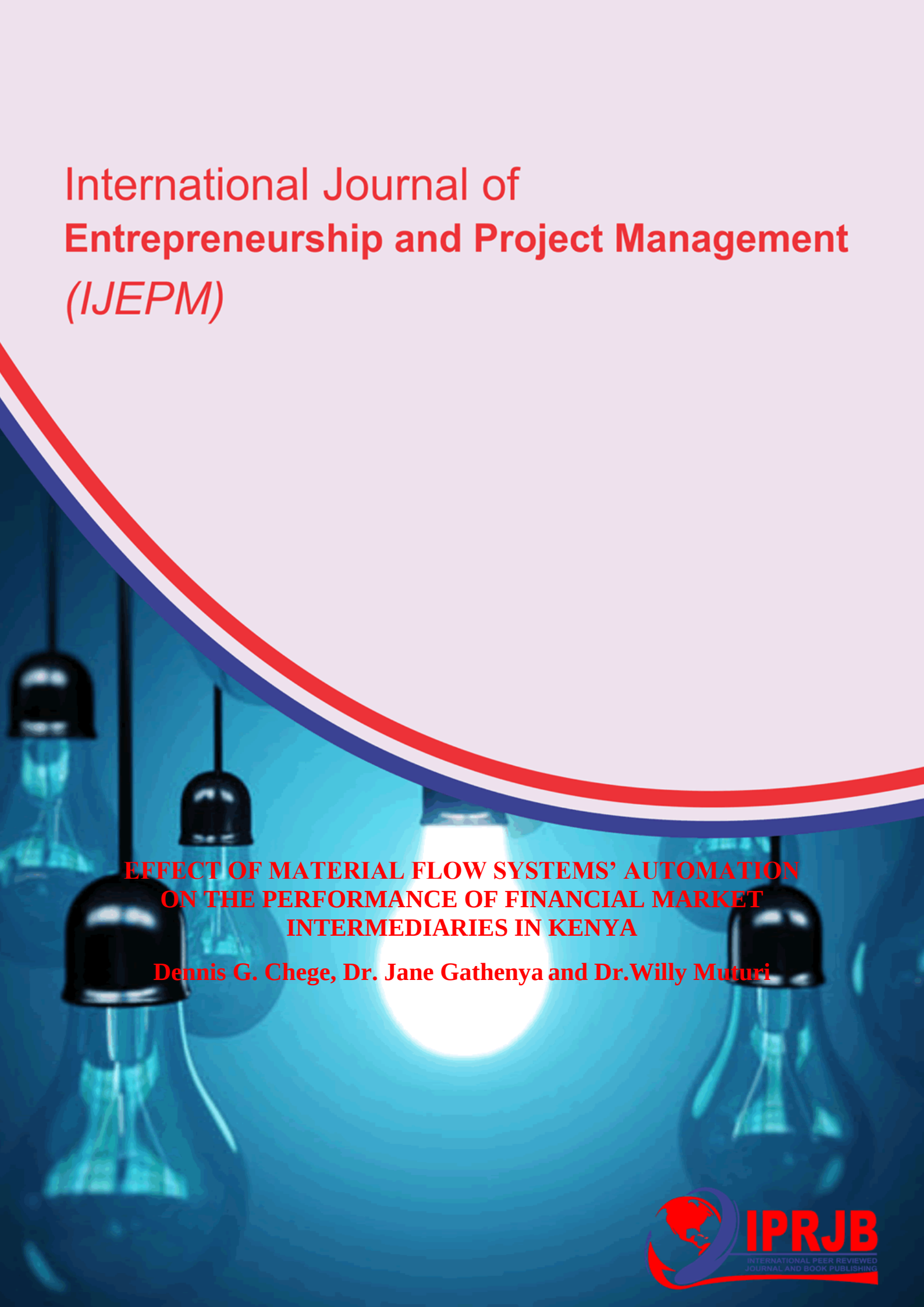

EFFECT OF MATERIAL FLOW SYSTEMS' AUTOMATION ON THE PERFORMANCE OF FINANCIAL MARKET INTERMEDIARIES IN KENYA

Dennis G. Chege, Dr. Jane Gathenya and Dr.Willy Muturi

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EFFECT OF MATERIAL FLOW SYSTEMS' AUTOMATION ON THE PERFORMANCE OF FINANCIAL MARKET INTERMEDIARIES IN KENYA

[1*]Dennis G. Chege
Post Graduate Student: School of Entrepreneurship, Procurement and Management
Jomo Kenyatta University of Agriculture and Technology
*Corresponding Author's E-mail: dennisprocurement@gmail.com

[2]Dr. Jane Gathenya
Lecturer, Jomo Kenyatta University of Agriculture and Technology
[2]Dr.Willy Muturi
Lecturer, Jomo Kenyatta University of Agriculture and Technology

Abstract

Purpose*:* To establish the effect of material flow systems' automation on the performance of financial market intermediaries in Kenya.

Methodology*:* The study adopted a longitudinal approach, with study population being 218 employees in 109 financial market intermediary firms. The study used a census approach which greatly helps deal with the sampling errors involved in most studies of this kind. Additionally the study employed both primary and secondary data. Primary data was collected through questionnaire while secondary data was obtained from the firm's financial records. A pilot study was conducted to measure the research instruments reliability and validity. Descriptive and inferential analysis was conducted to analyze the data while multiple and simple regression analysis was used to measure firms' performance as influenced by supply chain automation. The data was presented using tables, graphs and charts.

Results*:* Based on the findings the study concluded that material flow processes influenced the performance of financial market intermediaries in Kenya. This can be explained by the regression results which showed that the influence was positive and also showed the magnitude by which material flow processes influenced the performance of financial market intermediaries. The regression results showed that material flow processes influenced the performance of financial market intermediaries by 0.426units.

Unique contribution to theory, practice and policy: The study recommended for fully automation of material flow systems in the financial market intermediaries. This is because management and control of material flow systems is an important method of increasing firms' profitability, more so given the process' centrality in matching supply of materials, production of goods, warehousing on the one hand, and consumer demand and marketing on the other.

Keywords: *material flow systems, automation, performance, financial market intermediaries*

INTRODUCTION

Background of the Study

Harland (2010) defines supply chain management as the "design, planning, execution, control, and monitoring of supply chain activities with the objective of creating net value, building a competitive infrastructure, leveraging worldwide logistics, synchronizing supply with demand and measuring performance globally". According to Becker (2000), supply-chain problems cost companies between 9 and 20 percent of their value over a six-month period. Despite this, attempts to automate solutions to majority of these problems are complicated by the need for the different players in a supply chain to maintain the integrity and confidentiality of their information systems and operations. However, for companies to achieve their supply chain management objectives, they must fully integrate and automate all departments and partners, rather than certain areas. Towards this end, technology becomes an indispensable "enabler" for supply chain automation (Nash, 2010).

Like other commercial entities, financial intermediaries - institutions that facilitate the channeling of funds between lenders and borrowers indirectly (Pierre, 2011) - need to automate their supply chain processes in order to increase operating efficiencies, improve profitability, and enhance overall performance. Halachimi (2012) defines performance in stock brokerage firms as being the achievement of business, financial, effectiveness, and organizational objectives. Armstrong (2011) adds that such performance is indicated by market share, sales growth, and development of new products while financial performance is indicated by profit margin, total assets and equity multiplier. Indicators of effectiveness include quality of service, degree of social responsibility, positive work culture, and good image of the company and level of customer satisfaction. Chavan (2009) argues that performance focuses not only on what people achieve, but also how they achieve it. Boatright (2012) adds that financial performance is a subjective measure of how well a firm can use assets from its primary mode of business and generate revenues. This term is also used as a general measure of a firm's overall financial health over a given period of time, and can be used to compare similar firms across the same industry or to compare industries or sectors in aggregation.

According to Wangai and Ngugi (2014), the performance of a stock market of an economy is of interest to various parties including investors, capital markets, the stock exchange and government among others. Stock market performance is influenced by a number of factors, key among them being government activities, and the general performance of the economy. Other factors that affect the stock market's performance include, availability of other investments assets, change in composition of investors, and markets sentiments among other factors (Mendelson & Robbins, 2003).

Kenneth (2009) postulates that brokerage services industry is cyclical and performance is tied most closely to that of the stock market, which tends to lead economic performance. Christopher (2012) links the stock market cycle to economic cycle and argued that the relationship is far from perfect; with stock market downturns leading recessions by approximately nine months, and market upswings preceding expansions by about five months. Adjasi (2010) attributes the brokerage industry's cyclical nature to two factors. First, most of its business lines (commissions, trading, investment banking, etc.) have a tendency to move in tandem expanding during bull market runs and contracting during corrections. Second, employment numbers increase during bull markets and are significantly cut during bear markets, thus amplifying the effect of the next boom or bust on brokerage firms' bottom lines. This notwithstanding, argues Christopher (2009), the role of supply chain automation is

to create a major source of competitive advantage for the enterprise to differentiate itself in the eyes of the customers from its competitors by operating at a lower cost and hence at a greater profit.

Performance of stock markets differs significantly among countries in the developed, developing, and in the third world due to a myriad of factors. In the US, for instance, rapid technology has led to use of online brokerage, which has significantly changed the dynamics of the marketplace, causing one of the biggest shifts in individual investors' relationships with their brokers since the invention of the telephone. According to Franklin (2012) the percentage of equity trades conducted online has grown tremendously, signaling better performance in the brokerage firms in the US.

Japan, on the other hand, has experienced mixed results in the performance of their brokerage firms. The brokerage firm's traditional main source of revenues, commission fees for undertaking trade, has been threatened by the rise of online discount brokerage firms. The revenues of securities firms that depended on commissions deteriorated. As a result, leading online brokers in Japan have made intensive investment in their internet-based trading systems to offer a variety of advanced trading tools for individual traders. Among the middle to small firms, some select mergers and some enter a partnership with nationwide banks while others are forced out of business (Ministry of Internal Affairs and Communications, 2008).

Performance of the stock market in emerging markets has had mixed results. For instance, August of 2015 saw the Shanghai Composite Index (SCI) fall by more than 20%. The losses, concentrated at the end of the month, represented the second significant market drop in less than two months, following a similar plunge in July (Bendini, 2015). The rout was dramatic, but so had the gains; given that backlash had come after a remarkable growth of the Shanghai stock market by more than 150 % between June 2014 and June 2015. According to Bendini (*ibid*), this plunge saw Chinese investors lose close to EUR 5 trillion - a sum higher than China's entire market capitalization in 2012. In the weeks since the SCI reached its 12 June peak, the index has lost more than 40 % of its capitalization. The smaller and technologically-oriented Shenzhen Stock Exchange (STE) suffered even higher losses, nullifying all the gains that it had made in 2015.

Sumra *et al* (2011), in their study of the impact of internet trading on the profitability of investment banks and brokerage firms in Pakistan ascertained that the proliferation and penetration of internet opened new horizons and scenarios for the retail banking industry. As the scholars found out, banks provided their products and services through the electronic medium; where internet banking was considered to have substantial impact on banks' performance. They concluded that internet trading had increased the profitability of investment banks and brokerage firms; it had enabled them to meet their costs and earn profits even in the short span of time.

In Kenya, a third world country, dealing in stocks and shares started in the 1920s when the country was still under British colony (Wangai & Ngugi, 2014). There was however no formal market, no rules and no regulations to govern stock brokerage activities. Trading took place on gentlemen's agreement in which standard commissions were charged with clients being obligated to honor their contractual agreements of making good delivery and settling relevant costs. In 1951 Francis Drummond established the first professional stock brokerage firm and other stock brokerage firms were later established (Wangui & Ngugi, *ibid*2014). The Nairobi Stock Exchange was constituted as a voluntary association of stockbrokers registered under the societies Act in 1954 and in 1991 the Nairobi Stock Exchange was incorporated

under the companies Act of Kenya as a company limited by guarantee and without a share capital. Subsequent development of the market has seen an increase in the number of stockbrokers, introduction of investment banks, establishment of custodial institutions and credit rating agencies and the number of listed companies have increased over time. Securities traded include, equities, bonds and preference shares (NSE, 2014).

Kibuthu (2005), notes that the period preceding the 2002 general election saw the NSE experience decline in market performance. The uncertainty of the business environment resulted in the decline in the confidence and subsequently poor performance of the stock market. After the new government came into power, the market infrastructure was improved by installation of a computerized central depository system (CDS) introduced on November 2004 and whose operations included, keeping the share registry, clearing and settlement arrangement hence assuring faster, safer and easier trading insecurities *(*Kibuthu, 2005). Despite the measures taken, several firms such as Nyaga Stock Brokers and Thuo Stock Brokers were declared bankrupt back in the year 2007. Discount Securities Limited was also placed under receivership and several other companies continue to face solvency challenges.

Problem Statement

According to Nairobi Stock Exchange (2014) cases of financial market intermediaries having performance problems has been on the rise since the 2006.This is the same year that the stock market was automated in Kenya. The collapse of stockbrokerage firms has resulted to market decline as whole, investors lose money and cut back on their consumption leading to low economic development. Recessions witness the loss of jobs, and again a decline in consumption (Wangai & Ngugi, *ibid*). The rate at which the financial intermediaries have been performing poorly and collapsing is alarming and it begs the question whether automation had something to do with it. Over the past few years, Kenyans have watched desperately as brokerage firms such as Nyaga and Thuo Stockbrokers either collapsed or went under receivership, taking with them about Ksh3 billion of investors' money (Daily Nation, Oct 28, 2009). Much of this poor performance has been blamed on the macro environment such as the cyclical nature of the financial markets industry, with performance tied most closely to that of the stock market. This, in turn, is related to economic performance and the relationship between the stock market and economic cycle. The imperfections in the macro-economy lead to stock market downturns consequently leading to poor performance of brokerage firms (Kenneth, 2009).

However, trading at the NSE involves stockbrokers and other intermediaries, who control the investor's orders running in the supply chain through the Automated Trading Systems (ATS), (Otuke, 2006). There have been complaints raised by investors' touching on certain intermediaries, with the money at various levels of the supply chain not adding up in the clearing accounts (Ngigi, 2011). Concerns of supply chain fraud have also been raised with some brokers living off their clients' investment with shares being traded without permission. Other market players will fail to pay promptly the proceeds as required by law under NSE regulations (Bonyop, 2009).

However, a report by the World Bank shows automation of the supply chain through introduction of information technology had contributed to improved performance of financial market intermediaries in the developed world (World Bank, 2013). Based on these findings, the study set out to establish whether the same would hold for the financial market players in developing countries a case in Kenya. Specifically, the study sought to establish the effect of material flow systems' automation on the performance of financial market intermediaries in Kenya.

Research Objective

To establish the effect of material flow system's automation on the performance of financial market intermediaries in Kenya.

LITERATURE REVIEW

Theoretical Framework

Supply Chain Management/Systems Theory

This theory has been widely used by scholars in trying to explain issues surrounding supply chains and the enhancing systems. Some scholars such as Sushil (2012) emphasized the need for a 'flexible system theory', relating to several systems based approaches and techniques as a means of effectively catering to problem situations. According to Siau (2010) new insights are gained by abstracting the view of the information systems field. In a similar vein, new and crucial insights may emerge out of the application of general systems theory to supply chains and supply chain management.

As suggested by Caddy (2010) the purpose of developing a Generic Supply Chain Model (GSCM) is to provide a deeper understanding of supply chains, in terms of their development, operation and management. A representative literature review of supply chain and supply chain management frameworks and models reveal that there is not an already developed and generally accepted comprehensive model of supply chain as revealed by (Helou, 2009). According to Moon (2009) models of supply chain seem to concentrate on only one particular aspect or dimension of the supply chain, viz. organization structure/strategy while negating on other aspects such as information technology and human factors as was proposed by (Calantone, 2010). If views by Sushil (2012) are anything to go by, each of these dimensions should be considered crucial by their own, as each factor by itself does not provide a complete and comprehensive view of supply chains and their management. Combining the above mentioned three dimensions result in the development of a generic supply chain model, in which each of the dimensions provides a separate as well as a related conjoint contribution. The generic model shown below allows for the diversity of real world situations by incorporating into the model the interactions among the three dimensions. Different outcomes are generated given the nature of the type and level of interaction. In addition, the type and level of interactions it would be contingent upon organizational culture, the environment in which the organization operates, and the characteristics of the supply chains utilized in the exchanges that occur among organizations.

Process theory

The application of process theory on information technology and business value was initially proposed by Soh & Markus (2012). Their process theory model suggests that investments in IT projects, applications, and skill base represent creation of IT assets in an organization. Successful deployment of IT assets leads to redesigned processes, improved decision-making, and improved coordination. The model further argues that IT infrastructure, rather than directly impacting aggregate firm performance, may instead support critical processes that improve firm performance. The process theory view of IT payoff is that firms derive business value from intermediate operational and management processes. As IT continues to permeate the organization, the authors argue, automation has a greater impact on the processes and eventually on the organization.

Complementing the process theory models were the findings of Barua (1996) who presented a theory of business value complementarity. Using the process model the authors argue that the value of having more of one factor increases by having more of another complementary factor. The authors suggest that organizational payoff is maximized when several factors relating to IT, organizational structure, business processes, and incentives are changed in a coordinated manner in the right directions by the right magnitude to move toward an ideal design configuration.

Applying the process theory to the notion that IT exerts indirect effects on firm performance via process variables, the current study proposes that automation of security market compliments organizational characteristics and processes, and that the adoption of IT and business process optimization cannot succeed if done in isolation. Thus, even with automation of the security market performance of firms may differ depending on other factors such as organizational structure, human resource among others.

Empirical Review

Material flow is one of the crucial areas in supply chain automation, as it serves as the key materials feeding channel into the production process, whether tangible products or intangible. According to Tanchoco (2012), key factors to consider when planning for an effective material flow automation system include the specifications of individual system components, as well as the overall objective of the manufacturing system. Within a manufacturing process, from where supply chain management and automation evolved, material flows through the production line, the route ways between factory and suppliers and customers. Tancho (ibid) further adds that manage and control of material flow is an important method of increasing firms' profitability, more so given the process' centrality in matching supply of materials, production of goods, warehousing on the one hand, and consumer demand and marketing on the other.

The main purpose of automating the material flow process is to decrease the cost of logistics and inventory, while increasing the efficiency of material sources and information, in order to satisfy market requirements (Luo, 2006). To achieve this, scholars have developed a number of models to optimize the process. This includes Material Requirements Planning (MRP), Just In Time (JIT) delivery, an d Lean Manufacturing. MRP is a set of algorithms designed to establish material requirements based upon known sales orders (or forecast), bills of materials and material supplier lead times (OSIRS, 2008). The limitation with MRP is that the algorithms are normally carried out in sequence. In other words, the materials requirements are calculated in advance, after which then organization plans the capacity. In practice, however, this would lead to capacity constraints, mean that materials could be delivered later or may be required earlier; hence re-planning of materials is required. In this case, there would be more problems, such as increased lead-time, which could impact the capacity planning and so the process goes on.

JIT is a methodology aimed primarily at reducing flow times within production as well as response times from suppliers and to customers. Following its origin and development in Japan, largely in the 1960s and 1970s and particularly at Toyota (Ohno, 1978). The heart of JIT is the kanban card - a pull system that triggers the movement of materials from one operations through to the next (MANAGE, 2008). In a JIT environment, both earliness and tardiness must be discouraged since early finished jobs increase inventory cost, while late jobs lead to customer dissatisfaction and loss of business goodwill (Wong, 2006). The typical attention areas of Just-In-Time include: Inventory reduction; smaller production lots and

batch sizes; quality control; complexity reduction and transparency; flat organization structure and delegation; and waste minimization (MANAGE, 2008).

Lean manufacturing or lean production, often simply "lean", is a systematic method for the elimination of waste ("Muda") within a manufacturing system. Lean also takes into account waste created through overburden ("Muri") and waste created through unevenness in workloads ("Mura"). Working from the perspective of the client who consumes a product or service, "value" is any action or process that a customer would be willing to pay for.

Essentially, lean is centered on making obvious what adds value by reducing everything else. Lean manufacturing is a management philosophy derived mostly from the Toyota Production System (TPS) (hence the term Toyotism is also prevalent) and identified as "lean" only in the 1990s (Womack et al, 1990). TPS is renowned for its focus on reduction of the original Toyota seven wastes to improve overall customer value, but there are varying perspectives on how this is best achieved. The steady growth of Toyota, from a small company to the world's largest automaker, (Bailey & David, 2008) has focused attention on how it has achieved this success. In three approaches discussed above, among others, highlight the centrality of material flow management in ensuring a firm's efficiency, and productivity.

Another aspect of material flow is execution flexibility, which is the ability of the physical and non-physical flow to adapt to changes. Flexibility means the ability to produce different sizes, volumes, or variations of products with minimum penalties in costs, quality or time (Upton, 1994). Also it's the description of the transportation of raw materials, pre-fabricates, parts, components, integrated objects and finally products as a flow of entities. It incorporates the aspects of volume, mix, timing, and new product flexibility, as well as responsiveness to the market, which have been identified to be the most important aspects of supply chain.

Conceptual Framework

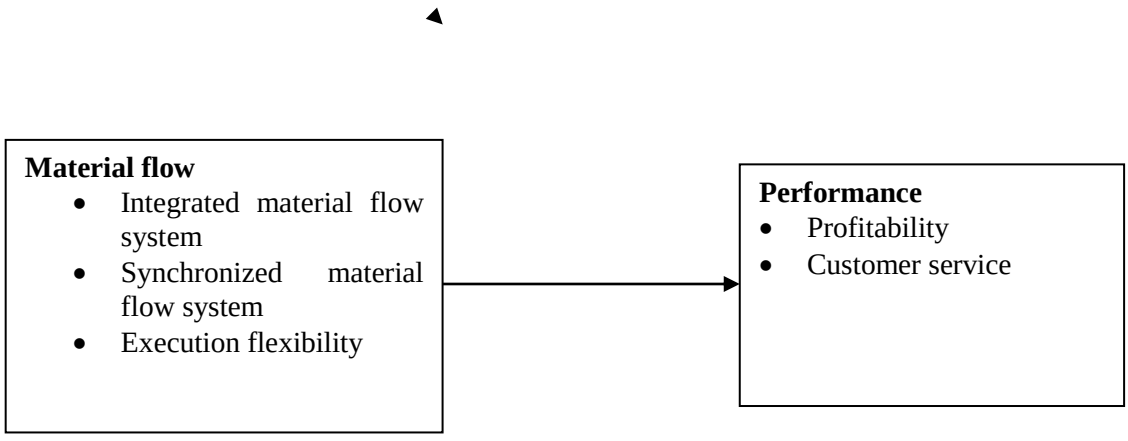

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

The study employed a longitudinal approach. The study used the standard population list of all approved intermediaries in Kenya. The study used the investment analyst or supply chain officers under the licensed financial market intermediary firms and thus used the entire population as a sample by selecting 2 employees under each organization as respondents. The total target population was 218 respondents. The study assimilated a census approach. The study used both secondary and primary data. Descriptive statistics such as mean scores, standard deviations, percentages, and frequency distribution were computed to describe the characteristics of the variables of interest in the study. Statistical package for social sciences (SPSS) computer software was used. Microsoft excel was used to complement SPSS especially in production of diagrams and tables. Inferential statistics such as correlation and regression analysis as suggested by Muthen and Muthen (2007) was used to establish the nature and magnitude of the relationships between the variables and to test the hypothesized relationships. Specifically, the study adopted a linear regression model for the test of the effect of the above model on performance of the stock brokerage firm.

RESULTS AND DISCUSSIONS

Response Rate

The number of questionnaires that were administered was 218. A total of 170 questionnaires were properly filled and returned. This represented an overall successful response rate of 78% as shown on Table 1. This agrees with Babbie (2004) who asserted that return rates of 50% are acceptable to analyze and publish, 60% is good and 70% is very good. Based on these assertion 78% response rate is adequate for the study.

Table 1: Response Rate

Response	Frequency	Percent
Returned	170	78%
Unreturned	48	22%
Total	**218**	**100**

Demographic Characteristics

This section analyzes the demographic characteristics of the respondents. This section presents the descriptions of the respondents in terms of the number of years worked; type of organization; and period of existence.

Number of years worked

The respondents were asked to state the number of years they had worked in their respective firms. Results in table 2 reveal that 36% of the respondents indicated less than 5 years, 32% indicated 11-15 years, 25% indicated 6-10 years while 7% of the respondents indicated more than 15 years. This implies that a large number of the employees working in the financial intermediaries were recently employed. This implies that the new employees have the potential and energy to improve the performance of the firms. At the same the time, the firms have a good percentage of employees who have worked for more than 10 years. These findings agree with those of Nyajom (2013) who in his study found out that 36.6% of the respondents had served in the state corporations for 21 years and above, 26.8% of the respondents had served for 16–20 years, 19.5% had worked in state corporations for 11–15 years, 12.2% had worked for 6–10 years while 4.9% had worked for 1–5 years.

This implies that the firms' have skilled and experienced employees who have the capacity to improve the performance of the firms.

Table 2: Number of years worked

Number of Years Worked	Frequency	Percent
Less than 5 years	61	35.9
6-10 years	42	24.7
11-15 years	55	32.4
more than 15 years	12	7.1
Total	**170**	**100**

Organization Type

The respondents were asked to indicate the type of financial organization they represent. Results in table 3 reveal that majority (62%) of the respondents indicated fund management firms, 15% indicated brokerage firms, 12% indicated investment banker firms while 10% indicated other financial intermediary firms. This implies that there are more fund management firms compared to other financial intermediaries combined. This agrees with Jan and Stoeldraijer (2010) who asserted that the type of organization directly proportional to the performance of the organization. This implies that the fund management firms offer services that are highly attractive to the customers. This should boost their performance.

Table 3: Organization Type

Organization Type	Frequency	Percent
Broker	21	15.3
Investment Banker	17	12.4
Fund management firm	106	62.4
Other	26	10
Total	**170**	**100**

Period of Existence

The respondents were asked to indicate the number of years their organization has been in existence. Results in table 4 reveal that majority (95%) of the respondents indicated over 10 years, 3% indicated 6-10 years while 1% indicated 1-5 years and less than 1 year respectively. Brown and Duguid (2003) found that highly skilled personnel enhance production of high quality outcomes and effective quality improvement in an enterprise. This implies that majority of the financial intermediaries have been in operation for more than a decade. This implies that the organizations have sufficient experience in the financial market.

Table 4: Period of Existence

Period of Existence	Frequency	Percent
Less than 1 year	2	1.2
1-5 Years	2	1.2
6 – 10 years	4	2.4
over 10 years	162	95.3
Total	**170**	**100**

Descriptive Statistics

The first objective of the study was to establish the effect of material flow on the performance of financial market intermediaries in Kenya. The respondents were asked to respond to statements on material flow. The responses were rated on a five likert scale as presented in Table 5. Majority of 99% (83.5%+14.7%) of the respondents agreed with the statement that the firm has an integrated material flow system, 98% agreed with the statement that we have control systems in our material flow system, 81% of the respondents agreed that the firm uses synchronized material flow system which is cost effective, 90% of the respondents agreed that we have a lean material flow system, 99% agreed with the statement that our material flow system has execution flexibility, 96% of the respondents agreed that the material flow is integrated using the ICT solutions while 92% of the respondents agreed that our material flow system can handle volumes needed by the firm.

On a five point scale, the average mean of the responses was 4.20 which means that majority of the respondents were agreeing with most of the statements; however the answers were varied as shown by a standard deviation of 0.56.

The findings concur with that of Luo (2006), who concluded that the main purpose of automating the material flow process is to decrease the cost of logistics and inventory, while increasing the efficiency of material sources and information, in order to satisfy market requirements.

Table 5: Material Flow

Statement	Strongly disagreed	Disagree	moderately agree	Agree	Strongly agree	Mean	Std. Dev
The firm has an integrated material flow system	0.00%	0.00%	1.80%	83.50%	14.70%	4.13	0.39
We have control systems in our material flow system	0.00%	0.00%	1.80%	78.20%	20.00%	4.18	0.43
The firm uses synchronized material flow system which is cost effective	1.20%	0.00%	17.60%	61.80%	19.40%	3.98	0.69
We have a lean material flow system	0.00%	0.00%	10.00%	60.00%	30.00%	4.20	0.60
Our material flow system has execution flexibility	0.00%	0.00%	1.20%	54.10%	44.70%	4.44	0.52
The material flow is integrated using the ICT solutions	0.00%	0.00%	3.50%	48.20%	48.20%	4.45	0.57
Our material flow system can handle volumes needed by the firm	3.50%	0.00%	4.10%	75.30%	17.10%	4.02	0.73
Average						**4.20**	**0.56**

The respondents were asked to state whether material flow systems improves performance. Results in table 6 reveal that 94% of the respondents agreed that material flow systems improve performance while only 6% of the respondents who did not agreed that material flow systems improve performance of their organization.

Table 6: Material flow systems influence on performance

Response	Frequency	Percent
No	10	5.9
Yes	160	94.1
Total	**170**	**100**

The respondents who said yes were asked to explain why they felt that material flow improves performance. The best responses were as follows," they reduce cost; the material flow is faster; the material flow is more flexible; there is more material flow in the firm*"*

The respondents were further asked to state whether automation affects material flow systems. Results in table 7 reveal that 69% of the respondents indicated yes while 31% of the respondents indicated no. This implies that most of the respondents believe that automation has an influence on material flow systems.

Table 7: Automation influence on material flow systems

Response	Frequency	Percent
No	53	31.2
Yes	117	68.8
Total	**170**	**100**

The respondents who said yes to the above question were further asked to give reasons why they felt that automation affects material flow systems. The best responses were as follows, "they reduce transportation cost; it has made work easier; sometimes the system volumes go very low".

Inferential Statistics

Correlation Analysis

Correlation analysis was conducted between material Flow (independent variable) and financial intermediaries' performance (dependent variable). Results in Table 8 indicated that there was a positive and a significant association between material flow and performance of financial intermediaries (r=0.784, p=0.000). This implies that material flow and performance of financial intermediaries change in the same direction. Further, the correlation coefficient (r=0.784) reveals a strong association between material flow and performance of financial intermediaries.

Table 8: Correlation matrix

	Performance	Material Flow	
Performance	Pearson Correlation	1.000	
	Sig. (2-tailed)		
Material Flow	Pearson Correlation	.784**	1.000
	Sig. (2-tailed)	0.000	

**. Correlation is significant at the 0.01 level (2-tailed).

Regression Analysis

Relationship between Material Flow Constructs and Performance of Financial Market Intermediaries

The results presented in table 9 present the regression model used in explaining the study phenomena. The results indicate that integrated material flow system (X_{11}) explained 14% of variations in performance of Financial Market Intermediaries in Kenya. Additionally, results showed that Synchronized material flow system (X_{12}) explained 17% of the variations in performance of Financial Market Intermediaries in Kenya. Lastly, results indicated that Execution flexibility (X_{13}) explained 33% of the variations in performance of Financial Market Intermediaries in Kenya. The findings are supported by a coefficient of determination (R^2) of 14%, 17% and 33% respectively.

Further, results indicate that the three models are statistically significant as supported by a p value of 0.000. This implies that integrated material flow system (X_{11}), Synchronized material flow system (X_{12}) and Execution flexibility (X_{13}) are good predictors of performance. The results were supported by F statistics of 26.483 (X_{11}), 34.375 (X_{12}) and 84.332 (X_{13}).

Lastly, results indicate a positive and significant relationship between integrated material flow system (X_{11}) and performance of Financial Market Intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.518). Further, results reveal a positive and significant relationship between Synchronized material flow system (X_{12}) and performance of Financial Market Intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.323). Finally, results show a positive and significant relationship between Execution flexibility (X_{13}) and performance of Financial Market Intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.602).

Based on the R squared and F statistics of the three constructs, it possible to rank the constructs as to which best explains the performance of Financial Market Intermediaries in Kenya. The findings indicate the R squared and F statistics of the three constructs as Integrated material flow system (R2=14%, F statistics=26.783); Synchronized material flow system (R2=17%, F statistics=34.375); and Execution flexibility (R2=33%, F statistics=84.332). This implies that (X_{13}) best explains performance, followed by (X_{12}) and then (X_{11}).

Table 9: Regression Results

	Model 1 Integrated material flow system (X_{11})	**Model 2** Synchronized material flow system (X_{12})	**Model 3** Execution flexibility (X_{13})
(Constant)	2.158	3.013	1.629
β1	0.518	0.323	0.602
R^2	0.136	0.170	0.334
F-statistics	26.483	34.375	84.332
P-value	**0.000**	**0.000**	**0.000**

Relationship between Joint Material Flow Constructs and Performance of Financial Market Intermediaries

The results presented in table 10 present the fitness of model used of the regression model in explaining the study phenomena. The results revealed that jointly, material flow constructs explained 55% of the performance of financial market intermediaries in Kenya. This is supported by coefficient of determination also known as the R square of 55%. This means that 55% of the total variations in performance of the financial intermediaries is explained by material flow. This implies that material flow is a very critical component of the supply chain processes. Firms should, therefore, ensure that the material flow systems are functioning properly.

Table 10: Model Fitness

Indicator	**Coefficient**
R	0.743
R Square	**0.552**
Adjusted R Square	0.544
Std. Error of the Estimate	0.36587

Table 11 below provides the results on the analysis of the variance (ANOVA). The results indicate that the overall model was statistically significant as supported by a p value of (0.000) which was less than the conventional probability of (0.05) significance level. Further, the results were supported by an F statistic of 68.159 and the reported p value (0.000). This implies that the overall model was statistically significant and that material flow is a good predictor of financial performance.

These findings concur with those of Tanchoco (2012), who concluded that management and control of material flow is an important method of increasing firms' profitability, more so given the process' centrality in matching supply of materials, production of goods, warehousing on the one hand, and consumer demand and marketing on the other.

Table 11: Analysis of Variance

Indicator	Sum of Squares	Df	Mean Square	F	Sig.
Regression	27.372	3	9.124	68.159	0.000
Residual	22.221	166	0.134		
Total	49.593	169			

Table 12 below presents the regression of coefficient results. The findings revealed that there is a positive and significant relationship between material flow processes and performance of financial market intermediaries in Kenya as supported by a p value of 0.000 and a beta coefficient of (0.426). This implies that a change in material flow by 1 unit leads to a corresponding change in financial performance by 0.426units. In this case, when material flow increases by 1 unit, then performance of financial market intermediaries increases by 0.426units.

These findings agree with those of Tanchoco (2012), who concluded that management and control of material flow is an important method of increasing firms' profitability, more so given the process' centrality in matching supply of materials, production of goods, warehousing on the one hand, and consumer demand and marketing on the other.

Table 12: Regression of Coefficients

	B	Std. Error	T	Sig.
(Constant)	-1.161	0.418	-2.774	0.006
The firm has an integrated material flow system(X_{11})	0.530	0.088	6.041	0.000
The firm uses synchronized material flow system which is cost effective (X_{12})	0.112	0.049	2.296	0.023
Our material flow system has execution flexibility(X_{13})	0.637	0.056	11.372	0.000
	0.426	0.064	6.570	**0.000**

The optimal model;

$Y= \beta_0+ \beta_1 X_{11} +\beta_2 X_{12} +\beta_3 X_{13} +e$

Firm Performance = $-1.161+0.530 X_{11} +0.112 X_{12} + 0.637 X_{13}$

DISCUSSION CONCLUSIONS AND RECOMMENDATIONS

Discussion

The objective of the study was to establish the effect of material flow on the performance of financial market intermediaries in Kenya. Results revealed that the financial market intermediaries have an integrated material flow system. In addition, results revealed that the firms use synchronized material flow system which is cost effective. Further, the study findings showed that the firms' material flow systems are integrated using the ICT solutions, and that the firms' material flow systems can handle the required volumes.

Further, based on F statistics and R squared, Execution flexibility (X_{13}) was ranked first, Synchronized material flow system (X_{12}) second and integrated material flow system (X_{11}) third. This implied that Execution flexibility (X_{13}) best explains firm performance, followed by Synchronized material flow system (X_{12}) and lastly integrated material flow system (X_{11})

Correlation analysis showed that material flow and performance of financial market intermediaries are positively and significantly associated. Regression analysis indicated material flow has a positive and significant effect on performance of financial market intermediaries. The hypothesis results indicated that there is a significant relationship between material flow and performance of financial market intermediaries in Kenya.

Conclusions

Based on the findings the study concluded that material flow processes influenced the performance of financial market intermediaries in Kenya. This can be explained by the regression results which showed that the influence was positive and also showed the magnitude by which material flow processes influenced the performance of financial market intermediaries. The regression results showed that material flow processes influenced the performance of financial market intermediaries by 0.426units.

5.3 Recommendations

The study recommended for fully automation of material flow systems in the financial market intermediaries. This is because management and control of material flow systems is an important method of increasing firms' profitability, more so given the process' centrality in matching supply of materials, production of goods, warehousing on the one hand, and consumer demand and marketing on the other. Further, automation of material flow systems decreases the cost of logistics and inventory, while increasing the efficiency of material sources and information, in order to satisfy market requirements. Also, the study recommended that financial intermediaries should adopt several models of automation. This will enhance efficiency of the process. Some of the models include Material Requirements Planning (MRP), Just In Time (JIT) delivery, an d Lean Manufacturing.

Areas for Further Studies

The study recommends that a similar study should be conducted in the private sector for comparison purposes. The study also recommends that a study seeking to establish the effect of automating other processes on firm performance should be conducted. This would help to give insight to the financial intermediaries and other organizations on what other processes they should automate in order to improve their performance.

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